23. ITS ARCHITECTURE

BASIC REQUIREMENT

Intelligent Transportation Systems (ITS) projects funded by the Highway Trust Fund and the Mass Transit Account must conform to the National ITS Architecture, as well as to United States Department of Transportation (USDOT) adopted ITS Standards.

AREAS TO BE EXAMINED

1. *As of April 8, 2005, regions implementing ITS projects were required to have a Regional ITS Architecture in place. Regions not currently implementing ITS projects must develop a Regional ITS Architecture within four years from the date their first ITS project advances to final design.*

2. *ITS projects funded by the Highway Trust Fund and the Mass Transit Fund must conform to a locally adopted Regional ITS Architecture.*

3. *If a major ITS project is the first project in a region, then it should move forward based on a project level architecture that clearly reflects consistency with the National ITS Architecture. The project must be integrated with the locally approved Regional ITS Architecture.*

4. *ITS projects must use USDOT adopted ITS standards as appropriate. To date, the USDOT has not adopted any ITS standards. The USDOT encourages the use of ITS standards approved by standards development organizations.*

REFERENCES

1. TEA-21, PL 105-178, Section 5206(e).

2. 23 USC Section 502, Surface Transportation Research.

3. Federal Register: January 2, 2001 (Volume 66, No. 5, pp. 1455-1459) "FTA National Architecture Policy on Transit Projects."

QUESTIONS FOR THE REVIEW

1. *Is the grantee attempting to deploy ITS technologies?*

EXPLANATION

FTA grantees may deploy many types of ITS technologies and projects. An ITS project is defined in the ITS Architecture Policy Guidance as "any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS User Services as defined in the National ITS Architecture." Thus, if the project includes ITS components that implement any of the defined User Services it is considered an "ITS Project." There are currently 33 User Services, organized in seven User Service Bundles, represented within the National ITS Architecture. The User Services most likely to be proposed/implemented by an FTA grantee include:

- Travel and Traffic Management
  - Pre-Trip Travel Information
  - Route Guidance
  - Ride Matching and Reservation
  - Traffic Control
  - Highway Rail Intersection
- Public Transportation Management
  - Public Transportation Management
  - En-Route Transit Information
  - Personalized Public Transit
  - Public Travel Security
- Electronic Payment
  - Electronic Payment Services
- Emergency Management
  - Emergency Notification and Personal Security
- Information Management
  - Archived Data User Services

Examples of systems that may be implemented as part of transit ITS Projects are:

- **Pre-trip traveler information systems** through phone, 511 systems, kiosks, the web, and other electronic channels that help provide route and fare information or itinerary planning
- **En-route transit information** through 511 systems, variable message signs, enunciators, or personal devices that provide next vehicle and stop information, or route and itinerary planning
- **Multi-modal traveler information systems** that integrate transit information with highway, rail, and other options
- **Personalized public transit** for route deviation, flex route, and paratransit services
- **Transit management systems and management centers** using AVL, computer aided dispatch, GIS, and surveillance of network conditions to improve the travel time and reliability of the transit system, and provide for transfer connection protection
- **Transit Signal Priority** to improve the travel time and reliability of the transit vehicles operating in mixed flow, or crossing major arterials at grade
- **Carpool Ride Matching & Reservation systems**
- **Electronic payment systems** both at transit centers and stations and on vehicles that include both fare payment and the ability to pay for other services (parking or toll charges)
- **Communications systems** that provide the backbone for the vehicle and wayside communication to each other and to the transportation management center
- **Automatic Passenger Counters** for performance monitoring and service planning
- **Vehicle and system monitoring** that track system functions and provides warning of likely malfunction or maintenance needs
- **Vehicle, stop, or wayside surveillance** to provide for passenger, driver, and system safety and security. Silent alarms to notify authorities of an incident or emergency
- **Highway/Rail Intersection Protection** to improve the safety of rail-transit operations and buses that travel through rail intersections
- **Collision warning/avoidance, vision enhancement, and driver assistance** to ensure safe transit operations in increasingly congested conditions, or limited rights of way
- **Data archiving and information management systems** to store and analyze the real time system data and assist in service planning, system monitoring, and other decisions.

Examples of projects that are not ITS related include acquisitions of microcomputer equipment and software for essential business processes (e.g., word processing, spreadsheet and database applications). ITS projects are those that contribute to the provision of one or more ITS user services as described above.

REASON FOR THE QUESTION
Determine whether to pursue Questions 2 to 4
Input to Risk Assessment

SOURCES OF INFORMATION
The grantee should be able to provide a description(s) of ITS technology deployment projects. These may be available from feasibility studies, work statements in RFPs for project implementation, the TIP, or the STIP.

DETERMINATION
None

SUGGESTED CORRECTIVE ACTION
None

2. *Are the grantee's ITS projects and programs part of a locally approved Regional ITS Architecture?*

3. *Have all ITS projects awarded since April 8, 2005 been a part of the locally approved Regional ITS Architecture?*

4. *Has the grantee established a process for the systems engineering analysis of ITS projects? Has it applied the process?*

EXPLANATION
The ITS Architecture Policy provides flexibility to local areas in determining what agencies or organizations take the lead in developing the Regional ITS Architecture. The Policy requires that the regional ITS Architecture must be part of the local planning process and be consistent with and reflected in the Transportation Plan, TIP, and STIP. The FTA grantee is not likely to be the lead agency for the development of the Regional ITS Architecture. The lead agency may be the MPO or the State Department of Transportation. The grantee needs to be an active participant in the Regional ITS Architecture if the grantee is implementing ITS projects. The grantee's ITS projects must be included in the locally approved Regional ITS Architecture.
FTA grantees are required to follow a Systems Engineering Analysis in determining the final design of an ITS project. The process should include a number of alternatives that achieve the same objective and consider the technical merits, costs and value for the total life-cycle of each alternative. More information on the systems engineering process can be found online at: www.iteris.com/itsarch/index.htm and www.floridaits.com/SEMP/Index.htm.

REASON FOR THE QUESTION
PL 105-178 Section 5206(e)
Federal Register: January 2, 2001 (Volume 66, No. 5, pp. 1455-1459)

SOURCES OF INFORMATION
The grantee should provide documentation showing that ITS projects are included in the locally approved Regional ITS Architecture. Some Regional ITS Architectures are available on the Internet.

The grantee should be able to provide a description of the process for the Systems Engineering Analysis of ITS projects. If the process was applied to an ITS project(s), the grantee should be able to provide a report, a Request for Proposal for a system, procurement documents, or analysis describing the results.

DETERMINATION
If the grantee has or is implementing ITS technology projects and the projects are included in the Regional ITS Architecture, the grantee is not deficient. If the ITS projects are not included in the Regional ITS Architecture, the grantee is deficient. If the grantee has established a process for the Systems Engineering Analysis of ITS projects, and it has applied the process to its ITS projects, the grantee is not deficient. If not, the grantee is deficient.

SUGGESTED CORRECTIVE ACTION
The grantee needs to establish a plan to have its ITS projects included in the Regional ITS architecture. The grantee needs to develop and apply a process for the Systems Engineering Analysis of ITS projects.